U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administation
Center for Substance Abuse Prevention
www.samhsa.gov

FUNDING PROVIDED BY THE
U.S. DEPARTMENT OF EDUCATION

PREVENTION TALK

THE IMPACT OF ALCOHOL ON THE ADOLESCENT BRAIN

WRITTEN BY LYNDA KAMERRER
EDITED BY KRIS GABRIELSEN AND JACK WILSON

Issue Number 14

CSAP'S WESTERN CENTER FOR THE
APPLICATION OF PREVENTION TECHNOLOGIES
JULIE HOGAN, PH.D. DIRECTOR

Most of what we know about how alcohol impacts the brain comes from MRI studies of healthy youth, laboratory animals exposed to alcohol, and clinical research with adults. Alcohol (ethanol) is a drug affecting the tissues of the central nervous system. Its behavioral effects are a result of its action in the brain, and not on the muscles or senses themselves. Alcohol is a depressant, and depending on how much one drinks, can be a mild tranquilizer or a general anesthetic. Alcohol can seem to be a stimulant because it holds back the part of the brain responsible for social controls. As more alcohol is consumed, a number of brain functions are stifled, producing slurred speech, unsteady gait, blurred vision, impaired judgment, and slowed reflexes.

REMEMBER:

Alcohol use during the teen years may damage memory, learning capabilities, decision making, and reasoning.

The choice to drink alcohol is influenced by biology, individual characteristics, and social environment. As adolescents gain independence and shape an identity during this developmental period, taking risks can be appealing. This combination of circumstances makes them vulnerable to the addictive action of alcohol.[1] Alcohol affects the nervous system by stimulating the production of dopamine, a brain chemical that reinforces and motivates behavior, and it is abundant and active in the teen years. Rapid changes in dopamine levels may be one of the key factors in teen vulnerability to alcohol addiction.[2] Because the brain responds to prolonged or repeated alcohol consumption by adapting to its presence, teens can rapidly move from liking, to wanting, to needing alcohol.[3]

Alcohol may affect adolescent brains differently than adults'.[4] Research points to a faster reward pathway. Teens have less intense outward physical responses to alcohol; they don't become as uncoordinated or sleepy as adults do. This increases their likelihood of drinking more heavily and more often. Short-term or moderate drinking by teens impairs learning and memory far more than in adults. Other findings indicate even occasional heavy drinking injures young brains.

THINK ABOUT:

- Different individuals and different ethnic populations may have inherited characteristics that would yield a four-fold difference in the ability to chemically process alcohol.[5]
- Level of perceived stress was found to be the most powerful predictor of adolescent alcohol and other drug use, after peer substance use.[6]
- Adolescents pay more attention to consequences such as losing a driver's license.

ACTION STEPS:

- Provide clear and accurate information about alcohol at the earliest opportunity.
- Discuss alcohol advertising and the use of alcohol in movies, television, and books.
- Capitalize on teachable moments to communicate your values regarding social events your adolescents may be attending such as proms and graduation parties.

For more information call:

SOURCES:

[1] Chambers, R., Taylor, J. R., Potenza, M. N. (2003). Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability. *American Psychiatry, 160,* 1041-1052.
[2] Wallis, C., with reporting by Alice Park. (2004, May 10). What makes teens tick. *Time Magazine*, 56-65.
[3] National Institute on Drug Abuse. (2000). The brain: Understanding neurobiology through the study of addiction. Retrieved October 12, 2004, from http://www.drugabuse.gov/Curriculum/HSCurriculum.htm
[4] Spear, L.P. (2002). Alcohol's effects on adolescents. *Alcohol Research & Health, 26*(4), 287-291. Retrieved August 16, 2004, from http://www.niaaa.nih.gov/publications/arh26-4/287-291.htm
[5] National Institute on Alcohol Abuse and Alcoholism. (2003, April). Statement by Ting-Kai Li, M.D., Director NIAAA, on Fiscal Year 2004 President's Budget Request for the National Institute on Alcohol Abuse and Alcoholism. Retrieved August 16, 2004 from http://www.niaaa.nih.gov/about/statement03.htm
[6] Wagner, E.F. (1993). Delay of gratification, coping with stress, and substance use in adolescence. *Experimental and Clinical Psychopharmacology, 1*(1-4), 27-43.